

WHAT IS CLAIMED IS:

1. A mirror rocking member for an optical deflector, which comprises the mirror rocking member for deflecting light, and driving means for driving
5 the member, the mirror rocking member comprising:

a movable plate having a reflective surface;

an elastic member for rockably supporting the movable plate; and

a support for supporting the elastic member,
10 the movable plate having an electric element, which constitutes a part of the driving means, the movable plate including a first portion having the reflective surface, and a second portion including an electric
15 element, the first portion having a reflective-surface forming surface with the reflective surface formed thereon, the second portion having an electric-element forming surface with the electric element formed thereon, and the reflective-surface forming surface having an area smaller than an area of the electric-
20 element forming surface.

2. The mirror rocking member according to claim 1, wherein the reflective-surface forming surface of the first portion has a shape that is substantially inscribed with a shape of the electric-element forming
25 surface of the second portion.

3. The mirror rocking member according to claim 2, wherein the electric-element forming surface

of the second portion has a rectangular shape, and the reflective-surface forming surface of the first portion has an elliptical shape.

5 4. The mirror rocking member according to claim 1, wherein the movable plate, the elastic member, and the support are formed from a start wafer of a single-crystal silicon substrate.

10 5. The mirror rocking member according to claim 4, wherein the reflective-surface forming surface of the first portion has a dodecagon shape.

15 6. The mirror rocking member according to claim 4, wherein the first portion and the second portion of the movable plate are formed by processing the single-crystal silicon substrate in different shapes from opposite surfaces of the single-crystal silicon substrate by dry etching.

20 7. The mirror rocking member according to claim 4, wherein the single-crystal silicon substrate has a (100) plane orientation, the first portion of the movable plate is formed by processing the single-crystal silicon substrate by wet etching, and the second portion of the movable plate is formed by processing the single-crystal silicon substrate by dry etching.

25 8. The mirror rocking member according to claim 4, wherein the single-crystal silicon substrate has a (100) plane orientation, and the first portion

and the second portion of the movable plate are formed by processing the single-crystal silicon substrate by wet etching, respectively.

9. The mirror rocking member according to
5 claim 4, wherein a roundness (R) is applied to a concave corner portion of a step of the first portion and the second portion of the movable plate.

10. The mirror rocking member according to
10 claim 1, wherein the movable plate, the elastic member, and the support are formed from a start wafer of a silicon-on-insulator (SOI) substrate, which comprises two single-crystal silicon layers and an intermediate insulating layer positioned between the single-crystal silicon layers, and the first portion and the second
15 portion of the movable plate are partially constituted of the two single-crystal silicon layers, respectively.

11. The mirror rocking member according to
claim 10, wherein the elastic member is constituted of a part of one of the two single-crystal silicon layers.

20 12. The mirror rocking member according to claim 10, wherein the first portion and the second portion of the movable plate are formed by processing the two single-crystal silicon layers by dry etching, respectively.

25 13. The mirror rocking member according to claim 10, wherein one of the two single-crystal silicon layers has a (100) plane orientation, the first portion

of the movable plate is formed by processing the single-crystal silicon layer by wet etching, and the second portion of the movable plate is formed by processing the other one of the two single-crystal silicon layers by dry etching.

14. The mirror rocking member according to claim 10, wherein both the two single-crystal silicon layers have a (100) plane orientation, and the first portion and the second portion of the movable plate are formed by processing the two single-crystal silicon layers by wet etching, respectively.

15. The mirror rocking member according to claim 10, wherein a roundness (R) is applied to a concave corner portion of a step of the first portion and the second portion of the movable plate.

16. The mirror rocking member according to claim 1, wherein the electric element comprises a driving coil extending along a periphery of the movable plate, and the driving coil cooperates with a permanent magnet disposed in the vicinity of the driving coil to constitute the driving means.

17. The mirror rocking member according to claim 1, wherein the electric element comprises a pair of electrodes, which cooperate with a fixed electrode disposed opposite to the electrodes to constitute the driving means.

18. A mirror rocking member for an optical

deflector, which comprises the mirror rocking member for deflecting light, and driving means for driving the member, the mirror rocking member comprising:

5 a movable plate having a reflective surface;

 an elastic member for rockably supporting the movable plate; and

 a support for supporting the elastic member, the movable plate having an electric element, which
10 constitutes a part of the driving means, the movable plate having a reflective-surface forming surface with the reflective surface formed thereon, an electric-
 element forming surface with the electric element formed thereon, and at least one hollow formed inside
15 the movable plate.

19. The mirror rocking member for the optical deflector according to claim 18, wherein the movable plate further has a reinforcing rib structure formed inside the movable plate, such that the movable plate
20 has a large number of hollows.

20. The mirror rocking member for the optical deflector according to claim 19, wherein the reinforcing rib structure comprises a honeycomb structure.

25 21. The mirror rocking member for the optical deflector according to claim 20, wherein the reinforcing rib structure has a vent hole for

connecting an internal space of the movable plate to an external space.

22. A mirror rocking member for an optical deflector, which comprises the mirror rocking member
5 for deflecting light, and driving means for driving the member, the mirror rocking member comprising:

a movable plate having a reflective surface;

elastic members for rockably supporting the movable plate; and

10 a support for supporting the elastic members, the movable plate having an electric element, which constitutes a part of the driving means, the movable plate including a first portion having the reflective surface, and a second portion including an electric
15 element, the first portion having a reflective-surface forming surface with the reflective surface formed thereon, the second portion having an electric-element forming surface with the electric element formed thereon, and the reflective-surface forming surface
20 having an area smaller than an area of the electric-element forming surface.

23. A mirror rocking member for an optical deflector, which comprises the mirror rocking member for deflecting light, and driving means for
25 driving the member, the mirror rocking member comprising:

a movable plate having a reflective surface;

elastic members for rockably supporting the
movable plate; and

a support for supporting the elastic members,
the movable plate having an electric element, which
5 constitutes a part of the driving means, the movable
plate having a reflective-surface forming surface with
the reflective surface formed thereon, an electric-
element forming surface with the electric element
formed thereon, and at least one hollow formed inside
10 the movable plate.

Patented May 19, 1964